

### REMARKS

Claims 21 and 22 have been canceled herein, without prejudice, and therefore claims 1-13 and 24-29 are currently pending, with claims 14-20, 23 and 30-51 having been previously withdrawn in response to a restriction requirement. Applicants gratefully acknowledge the Examiner's indication that claims 1-11 and 13 have been allowed and that claims 25-29 contain allowable subject matter. Claims 25 and 28 have been accordingly rewritten in independent form. In addition, claims 12 and 24 have been amended. Reconsideration of the patentability of the pending claims is respectfully requested in view of the foregoing amendments and the following discussion.

Claim 24 has been provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-34 of copending Patent Application No. 90/782,354 in view of U.S. Patent No. 5,412,351 to Nystrom et al. ("Nystrom").

Claim 24, as amended, recites that data bands are spread in frequency when modulated onto the optical carrier signal, the spreading causing an amplitude of the optical data signal to be reduced to zero during all transitions between data symbols. The Examiner notes that the Nystrom reference indicates that in a four point I-Q constellation the power "occasionally" swing through zero output power. Nystrom, col. 3, lines 25-35. In order to **avoid** these zero-power crossings, Nystrom specifically discloses using  $\pi/4$  QPSK modulation. Nystrom, col. 3, lines 47-51. According to these passages, the Nystrom reference views the zero crossing of the output power during transitions in an I-Q constellation as a negative effect that must be compensated for.

In stark contrast, according to claim 24, these zero-crossings occur between all transitions in the I-Q constellation because it is found that forcing such zero-crossings causes other beneficial properties for optical transmission, such as reduction of cross-talk at certain data transmission rates. Thus, the claimed invention encourages the zero-crossings, while the Nystrom reference teaches the opposite, namely avoiding or discouraging such crossings.

It is accordingly submitted that Nystrom not only does not disclose the subject matter of claim 24, but actually teaches away from it.. For at least this reason, it is submitted that the double patenting rejection of claim 24 has been overcome.

Claim 22 has been rejected under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 6,141,141 to Wood ("Wood").

As claim 22 has been canceled, without prejudice, it is submitted that this rejection is no longer applicable.

Claim 12 has been rejected under 35 U.S.C. §103(a) as unpatentable over Nystrom in view of U.S. Published Patent Application No. 2001/0050962 to Adachi et al. ("Adachi").

Claim 12 has been amended in an analogous manner to claim 24, and recites during all transitional states of the quadrature modulated optical data signal in which data symbols change in value, reducing the power to zero such that transmitted power decreases to zero at approximately a mid point of the transitional states. As discussed above, Nystrom does not teach or suggest this feature as it actually provides a teaching for avoiding zero crossings of output power in an I-Q constellation. The Adachi reference does not cure the deficiencies of the Nystrom reference in this regard.

Thus, for essentially the same reasons discussed above with respect to claim 24, it is submitted that the cited references do not render obvious the subject matter of claim 12.

Claim 21 has been rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 6,259,836 to Dodds in view of Wood.

As claim 21 has been canceled, without prejudice, it is submitted that this rejection is no longer applicable.

Claim 24 has been rejected under 35 U.S.C. §103(a) as unpatentable over Dodds in view of Nystrom.

As discussed above, the Nystrom reference does not disclose or suggest forcing zero crossings between all transitions of an I-Q constellation during optical data modulation. The Dodds reference does not cure the deficiencies of the Nystrom

reference in this regard. Accordingly, it is submitted that claim 24 is not rendered obvious by the combination of Nystrom and Dodds.

### **CONCLUSION**

In light of the foregoing, Applicants respectfully submit that all pending claims 1-13 and 24-29 are in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.

Respectfully submitted,

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